SECTION 33 0513

MANHOLES AND STRUCTURES

****
LANL MASTER SPECIFICATION

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the ESM Civil POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within “stars” during editing.

Specification developed for ML-3 / ML-4 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.
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PART 1 GENERAL

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Refer to LANL Standard Civil Drawing ST-G3030-3 for storm water manhole detail and Drawing ST-G3020-1 for sanitary sewer manhole detail.
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1.1 SECTION INCLUDES

A. Precast concrete manhole sections and manhole frame and cover castings for use in [sanitary sewer and storm water] systems.

B. Precast concrete or fiberglass or (HDPE) polyethylene septic and holding tank sections, access frames and covers, and monitoring systems for use in sanitary sewer systems.

1.2 RELATED SECTIONS

A. Section 31 2000, Earth Moving.

B. Section 33 3200, Wastewater Utility Pumping Stations.

C. Section 33 3000, Sanitary Sewerage Utilities

D. Section 33 4000, Storm Drainage Utilities

1.3 LANL PERFORMED WORK

A. LANL’s Support Services Subcontractor (SSS) will tie into existing systems which include sanitary sewer lines, holding tanks, septic tanks, treatment plants, lift stations, and sewer manholes.

B. LANL Construction Inspector will coordinate all required inspections and tie-ins.

C. LANL Construction Inspector will coordinate through LANL Water Quality Group (ENV-RCRA) for inspection of septic tank and holding tank for compliance by New Mexico Environmental Department (NMED).

D. Application for septic tank or holding tank construction permit to NMED through LANL ENV-RCRA.

1.4 SUBMITTALS

A. Submit the following in accordance with Section 01 3300, Submittal Procedures:

1. Certifications: Furnish copies of materials certificates certifying that each material item complies with, or exceeds, specified requirements.

2. NMED approved septic tank list certification number.

3. Level alarm system product data and installation instructions for holding tank.

PART 2 PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Alternate products may be accepted; follow Section 01 2500, Substitution Procedures.

2.2 MATERIALS

A. Provide precast concrete manhole sections (base barrel sections, risers and conical/eccentric tops, flat slab tops, grade rings, etc.) per ASTM C478. Approved precast concrete septic tanks per ASTM C1227. Approved fiberglass or (HDPE) polyethylene septic or holding tanks per the Drawings.

1. Concrete: Compressive strength of 4000 psi for 28 days.

2. Sanitary Sewer Manhole: Provide [4] foot, [6] foot diameter manhole. Diameter furnished is dependent on depth, pipe size, number of inlet pipes, and if drop manhole.

3. Polyethylene/fiberglass tanks: Tanks shall have side reinforcements specifically designed to withstand the stress, when empty, from soil and surcharge loadings.

B. Manhole Frame and Cover

1. Provide castings true to patterns in form and dimension, and free from pouring faults, sponginess, cracks, blowholes, or other defects in locations affecting their strength and value for the service intended. Provide castings with fillets at angles with sharp and true risers.

2. Provide castings conforming to ASTM A48, Class 30B.

   a. Machine or grind bearing surfaces of the frames and covers to furnish a uniform, flat, non-rocking seat for the cover on the frame.

   b. Provide cover with the word “Sewer” cast on the sewer manhole cover.

   c. Provide cover with the word “Storm Drain” cast on the storm water manhole cover.

C. Sealing Gasket (precast manhole or tank sections): Mastic Gasket as manufactured by RAM-NEK or Kent Seal.

D. Septic or Holding Tank Access Ports: Install three foot diameter corrugated metal pipe riser over tank inspection/access port. CMP shall extend one foot above finish grade. Provide 3/16 inch steel plate cover 2 inches larger in diameter than CMP, with brackets to fit CMP and two handles welded to plate. Provide a 6 inch by 6 inch hinged opening, with handle, in the steel top plate cover for access to pump the tank without having to remove entire cover.

PART 3 EXECUTION

3.1 INSTALLATION

A. Compact soil foundations for manhole base or tanks to a density of 95 percent of the maximum density per ASTM D 1557. Compaction shall be minimum 1 foot beyond perimeter of concrete base and shall be a minimum of 1 foot in depth.

B. Invert elevation of pipes entering or exiting manhole or tanks and interior inverts shall not vary more than 0.05 foot from the elevations shown on the Drawings.

C. Use 4,000 psi at 28 days concrete for formed-in-place foundations or bases, concrete shelves, pipe supports, and concrete fill.

D. Depending on size of pipe, make connections to existing and new manholes by either core drilling through manhole wall (perform for new precast units), or carefully chipping wall segment. Take care to avoid unnecessary damage to manhole surfaces or walls.

E. Provide waterstop before placing non-shrink grout around piping in concrete manhole or tank wall. Coat interior surface of concrete manhole or tank to provide watertight seal, exclude storm drain manhole.

F. Piping connecting to a polyethylene/fiberglass tank shall of the same or compatible material as the tank. Connections shall be water proof and per tank manufacturers instructions.

G. Set the manhole and septic/holding tank level and plumb. Tanks shall have an anti-flotation device installed as shown on the Drawings and per manufacturers suggested installation.

3.2 MANHOLES

A. The vertical riser sections of manhole may be of different dimensions in order that manholes of various depths can be readily assembled.

B. Install circular precast manhole sections with sealing gasket to seal joints between sections. Clean joints prior to installation. Entire width of joint shall receive a layer of sealing gasket.

C. Fill lifting holes and gaps at joints with a nonshrink grout.

D. Precast concrete manhole bases may be used when approved by a LANL Utilities & Infrastructure Group wastewater system representative. If approved, it is with the understanding that placing the bases at the specified elevation, location, and alignment is the Contractor's responsibility.

3.3 SEPTIC AND HOLDING TANKS

A. Install precast concrete tank sections with sealing gasket to seal joints between sections. Clean joints prior to installation. Entire width of joint shall receive a layer of sealing gasket.

B. Cut and install CMP riser to provide a flush and vertical fit with tank. Use mastic and/or grout around and between CMP and top of tank to provide watertight seal.

C. Provide and install conduits from the building to the holding tank (only) for power and monitoring wiring for a high level alarm system. High level alarm, monitors, floats, and controls shall be supplied and installed per LANL Standard Specification 33 3200, Wastewater Utility Pumping Stations.

D. Provide communications link between the holding tank monitoring/controls and the TA-46 Wastewater Plant PLC system. System shall be installed and available for testing during the Acceptance Inspection.

E. Furnish and install all power connections and communication links to and from the control box in accordance with provisions of Division 26.

3.4 GRADE RINGS

A. Use mastic and/or grout to lay grade rings to provide watertight seal and for the prevention of displacement of rings.

B. Grade rings shall remain plumb and vertically aligned during backfilling and paving operations.

3.5 MANHOLE FRAME AND COVER

A. Provide ductile iron castings as shown on the Drawings and as specified herein. The castings shall include manhole frames and covers.

B. Seal between grade ring and frame with mastic and/or grout to provide watertight seal and for the prevention of displacement of rings and frame.

3.6 TESTING OF SEPTIC AND HOLDING TANKS

A. Test sanitary sewer septic and holding tanks for leakage by a water exfiltration test. Furnish all materials and equipment necessary to perform test and conduct test in the presence of the LANL Construction Inspector. Perform test prior to backfilling around tank and prior to placement of access ports and covers. Properly plug inlet and outlet lines and fill and seal holes and joints as specified. There shall be no allowable leakage. If septic or holding tank fails two exfiltration tests, the container shall be spraylined to specifications.

3.7 TESTING OF SEWER MANHOLES

A. Test sanitary sewer manholes for leakage by a water exfiltration test. Submit test reports to the LANL Construction Inspector. Perform test prior to backfilling around manhole and prior to placement of manhole frame and cover. Properly plug inlet and outlet lines and fill and seal lift holes and barrel joints as specified. In lieu of water exfiltration testing the manhole interior can be coated with a two part, high build epoxy lining with 100% solids by volume. Material shall have chemical resistance and be designed as a structural lining for manholes and vessels in wastewater facilities. Preparation of surface and application of product shall be per the manufacturer's instructions. If manhole(s) fail two exfiltration tests, the manhole(s) shall be spraylined to specifications.

1. Manufacturer: Raven Lining Systems.

B. Furnish all materials and equipment necessary to perform test and conduct test in the presence of the LANL Construction Inspector. Allow a stabilization period of 1 hour for absorption, after which, refill manhole as necessary before starting test. Perform test for a period of 2 hours, after which refill manhole, measuring necessary quantity of water. The difference in water surface elevation from original to final level shall be measured and converted to gallons per hour lost through manhole leakage. An allowable leakage is allowed and is represented by the following formula:

	V =	0.20 DHT
Where:	V =	Allowable loss in gallons
	D =	Manhole diameter in feet
	H =	Initial depth of water to invert in feet
	T =	Duration of test in hours

END OF SECTION

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Do not delete the following reference information:
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FOR LANL USE ONLY

This project specification is based on LANL Master Specification 33 0513 Rev. 1, dated August 23, 2006.